

Brochure

High-performance computing for the digital age

Compute: out of the lab and into the enterprise



Hewlett Packard
Enterprise

It's been said that high-performance computing (HPC) has the potential to improve overall quality of life by playing "a key role in fulfilling humanity's needs, ranging from the basics, such as food, water, shelter, and health, to hardship reduction, care for the earth, commerce, and entertainment, as well as answering some of life's most profound questions."¹ While that may seem like a tall order, HPC is already going well beyond its traditional research institution borders to revolutionise computing for users outside of those hallowed halls. In fact, industries as diverse as financial services, media, oil and gas, health and life sciences, higher education, and government are all now taking advantage of HPC to retool their business models for the digital age.

Success in the digital era requires a level of transformation and innovation that can only be met with a staggering level of performance, paired with efficiency and cost-effectiveness. Keeping up with ever-increasing transaction processing and exploding data warehouses is making HPC a requirement. HPC allows organisations to break through barriers of the past to run advanced applications efficiently and reliably, and to rapidly and affordably scale out to leverage emerging opportunities in ways that were unthinkable just a few years ago.

Hewlett Packard Enterprise's commitment to HPC

With more than 36 per cent market share, Hewlett Packard Enterprise (HPE) is a dominant leader in this fast-growing and vital sector, and has been for some time. From the first oscillators created for Walt Disney in 1938 to the HP Exemplar (Sioux) produced in 1997 to study atmospheric algorithms on cache-coherent, distributed, shared-memory (DSM) machines, Hewlett Packard Enterprise has been a key player throughout the discipline's history.

Currently, HPE's innovative, purpose-built HPC systems and technologies are enabling innovation at all levels and across the globe. The portfolio's key differentiators include a converged infrastructure purpose-built to scale; striking optimisation and efficiency; and straightforward management and deployment. Thousands of HPE employees are dedicated to evolving HPC in the areas of hardware, software, performance, consulting, and support. In addition, Hewlett Packard Enterprise has invested in HPC-specific vertical solutions, an expanded HPC Software stack, broad partnerships, and a rich, object-storage software portfolio.

Hewlett Packard Labs: surpassing computational limits

Hand-in-hand with the digital economy is the Internet of Things (IoT), promising to transform a number of industry sectors by connecting physical objects to their digital counterparts and capturing immense amounts of data in the process. However, the ability to effectively store, sort, and secure this data is sorely taxed. Hewlett Packard Labs, our fundamental research arm, is addressing these computational limits by reinventing the architecture of computers. The Machine—HPE's answer to the computational challenges of the future—represents a new way to compute from the ground up. Talented researchers hailing from a wide range of disciplines including semiconductor physics, photonics, systems engineering, and software architecture are working together to bring The Machine to life.

In addition to The Machine, HPE is working to deliver innovative HPC solutions to augment "traditional" supercomputing, driving computational models across thousands of compute cores. The evolution will deliver the unprecedented ability for customers to use familiar applications and programming languages to integrate massive amounts of data into traditional HPC through highly efficient, in-memory capabilities and task-specific storage solutions. Ultimately, these breakthroughs lead to dynamic, shared memory systems specifically architected to handle highly memory-intensive models for important endeavours like security, genome sequencing, and medical research.

Leadership-class HPC: the Apollo family of products

HPE's elegant solutions of efficiency, scale, and performance are industry bellwethers. The HPE Apollo family is a case in point. Purpose-built compute, storage, networking, power, and cooling solutions easily enable formerly unwieldy Big Data analytics, object storage, and high-performance computing (HPC) workloads.

¹ "HPC Matters," Dr. Eng Lim Goh, Plenary Leader, 2014; [Intel's® Diane Bryant to give HPC Matters plenary at SC15](#), Scientific Computing World, 14 September 2015

In 2013, HP (now Hewlett Packard Enterprise) unveiled a significant and bold new direction for leadership-class HPC: the award-winning, high-end HPE Apollo 8000 rack-level, warm water-cooled solution, representing a notable addition to our dedicated HPC portfolio. Along with the HPE Apollo 8000, Hewlett Packard Enterprise offers three levels of HPC-focused solutions for the enterprise:

- **HPE Apollo 2000**—Perfect for enterprises looking to easily enter HPC with general-purpose, scale-out computing
- **HPE Apollo 4000 family**—As the first of its kind for converged storage servers, the HPE Apollo 4000 family offers an air-cooled, shared infrastructure design for Big Data analytics and object storage
- **HPE Apollo 6000**—Optimised for rack scale HPC, the HPE Apollo 6000 offers a traditional rack-mounted, multi-node design for HPC and supercomputing

In a small footprint, the HPE Apollo Systems Family delivers:

- Just-right scalability, performance, and efficiency
- Reduced implementation time from months to days
- Scale-up and scale-out solutions
- An extended ecosystem of partners, integrators, and independent service vendors (ISVs)

The complete range of offerings makes highly dense server, storage, management, and rack-scale efficiency available to organisations of all sizes. A tiered approach offers a logical and simple starting point for data-driven organisations seeking to utilise Big Data, object storage, and HPC. Also available are a variety of rack, power, and cooling solutions designed and tested for reliability in high performance environments and compatible with HPE Apollo Systems.

HPE contributions to HPC success worldwide

In addition to the government agencies, scientific labs, and public and private universities across the globe already leveraging HPC, commercial enterprises are now getting in on the game to push the boundaries of traditional business. Real-world examples of customers using HPE compute solutions for revolutionary transformation include:



- **Apache Corporation**—As one of the world's top independent oil and gas exploration and production companies, Apache needed a high-performance, compact computing solution to provide graphics-heavy software solutions to remote users. Thanks to HPE compute, critical applications now run 50 per cent faster than on traditional workstations and cost 30 per cent less, including costs for hardware, shipping, and support.



- **Rolls-Royce**—Known as the most efficient engine flying in the world today, the Rolls-Royce Trent XWB offers some 20 per cent greater fuel efficiency than the engines it replaces. These efficiency improvements are achieved using HPE compute technology to run large-scale simulations to scale codes, resulting in a cost savings of around £2 million per aircraft, per year.



- **BIGLOBE**—Leading Japanese Internet and cloud service provider, BIGLOBE, adopted the HPE ProLiant SL4540 Gen8 Server to achieve a low-cost, 2 PB high-capacity storage environment; deploy 88 TB of disk capacity and 192 GB memory per each server node; and substantially reduce operating and maintenance costs.



- **RTL II**—Known for boosting video transfer speeds tenfold, German TV station RTL II needed to support a rapidly growing video archive expanding by 200 terabytes per year. Using HPE ProLiant SL4500 Scalable System and HPE ProLiant SL4540 Gen8 Servers, the station was able to assure delivery of the latest broadcast information; increase the amount of video content that can be moved to online outlets for streaming; simplify support with a standard hardware design; and reduce transfer time for 40 MB movie from 60–70 minutes to 6.5 minutes.

“More than a third of the high-performance computing market is now using HPE compute solutions to advance scientific and business innovation.”²

HPC partnerships and community

Intel partnership

As Big Data applications continue to drive the need for HPC solutions, Hewlett Packard Enterprise is strengthening strategic alliances, particularly with Intel. Recently, Hewlett Packard Enterprise and Intel jointly created the HPC alliance to help enterprise customers optimise their HPC installations for business benefits. Reflecting this union, our HPE Apollo Systems are now integrated with Intel’s HPC scalable system framework, delivering industry-specific solutions for the financial services, life sciences, and oil and gas industries.

Together we are providing customers with access to best-of-breed Intel and HPE technology, industry-optimised HPC solutions, and the opportunity to work with ISVs and Hewlett Packard Enterprise/Intel engineers to modernise code and optimise infrastructure for HPC-related workloads. In addition to making cutting-edge technologies and solutions available to customers, the alliance provides the intellectual property, portfolio services, and engineering support needed to evolve compute infrastructures to the level appropriate for a data-driven environment.

This deep partnership involves multi-year investment in both people and programs from both companies. Initiatives include joint Centres of Excellence (CoE), code modernisation, and the integration of Intel’s HPC scalable system framework with the existing HPE solutions framework to help organisations of all sizes drive innovation.

The High-Performance Consortium for Advanced Scientific and Technical Computing (HP-CAST)

The HP-CAST users group enhances the capabilities of HPE solutions for large-scale scientific and technical computing by guiding essential development and support initiatives as they arise. General and regional meetings typically include corporate briefings and presentations by HPE executives and technical staff (under NDA) and discussions of customer issues related to high-performance technical computing.

HP-CAST is unique in the industry, providing a forum for bidirectional sharing of best practices, technology directions, and secrets for success. Our leadership translates into thousands of customers helping us deliver the best solutions (hp-cast.org).

Learn more at
hpe.com/info/apollo

²“IDC’s Worldwide High Performance Technical Server QView 2015,” Earl Joseph and Bob Sorensen 15 September 2015



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